



Application Note AN-V-240

用法定甲状腺片中的含量

Polarography in pharmaceutical analysis: indirect determination of iodine after dry ashing in a muffle furnace

Thyroid hormones are made by the thyroid gland and play an important role in regulating metabolism and growth. Iodine acts as a building block and the specific number of iodine atoms determines the type of the hormone: four for thyroxine (T4) and three for triiodothyronine (T3). The number of iodine atoms is critical for the functionality of thyroid hormones. Levothyroxine and liothyronine (synthetic forms of thyroid hormones T4 and T3) are essential components of thyroid tablets. T4 is less active

and needs to convert to the more active T3 to be fully effective. Accurate iodine determination in thyroid tablets is a crucial quality control measure, ensuring the effectiveness and safety of thyroid treatments.

A robust method is introduced for indirect determination of total iodine content in thyroid tablets as iodate, according to United States Pharmacopeia (USP) guidelines using the 884 Professional VA and the Multi-Mode Electrode pro.

SAMPLE

Commercially available thyroid tablet containing

100 µg levothyroxine and 20 µg liothyronine.

EXPERIMENTAL

Sample preparation and the determination of iodine is carried out according to the USP monograph «Thyroid Tablets». The process involves dry ashing of the tablets, where organically bound iodine is released and later converted to iodate. The iodate content is determined with the 884 Professional VA (Figure 1) by differential pulse polarography.



Figure 1. 884 Professional VA.

ELECTRODES

- Working electrode: Multi-Mode Electrode pro
- Reference electrode: Ag/AgCl/KCl (3 mol/L) reference electrode with electrolyte vessel.
- Bridge electrolyte: KCl (3 mol/L)

- Auxiliary electrode: Platinum rod electrode

Table 1. Parameters for IO₃ determination

Parameter	Setting
Working electrode	DME
Mode	DP – Differential Pulse
Start potential	-0.8 V
End potential	-1.5 V
Potential step	0.005 V
Potential step time	1 s
Pulse amplitude	0.05 V
Peak potential iodate	-1.18 V

RESULTS

Calculation of the results was carried out according to the USP monograph «Thyroid Tablets».

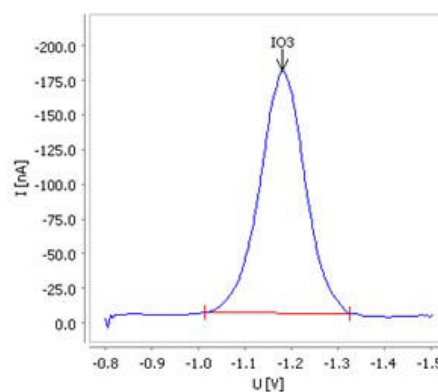


Figure 2. Determination of iodate in a thyroid tablet by differential pulse polarography with the 884 Professional VA and the Multi Mode Electrode pro.

Table 2. Results of iodine determination with the 884 Professional VA and the Multi-Mode Electrode pro.

Sample	Iodine in g / tablet	Recovery rate
Tablet	70.59	92.3%
Tablet spiked with 72.55 g	144.58	101.9%

Internal reference: AW VA CH-0633-042024

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CONFIGURATION



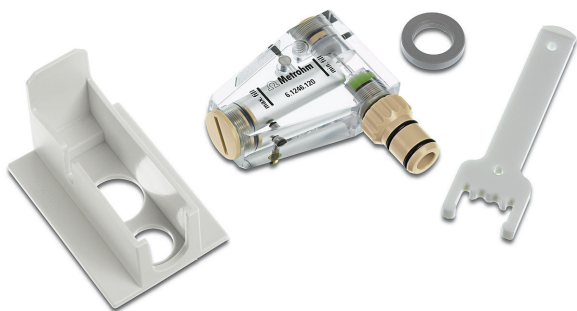
(MME) 884 Professional VA manual

用于多模式 (MME) 的 884 Professional VA manual 是借助多模式 pro 或 scTRACE Gold 或液滴使用伏安法和法行痕量分析的入器。此已的瑞士万通技与恒位/恒位以及外接的活 viva 件用,在重金属定域中展了新的前景。有的校准器的恒位在每次量之前均自冲洗行校准,保可能的高精度。

通此器也可使用旋行定,例如借助«循伏安溶出法»(CVS)、«循脉冲伏安溶出法»(CPVS)和位法(CP)定池中的有机添加。借助可更的量,可在使用不同的各用之快速切。

使用 viva 件行控制、数据采集和估。

用于 MME(多模式)的 884 Professional VA manual 供配大量附件,包括用于多模式 pro 的量。和 viva 可独。



Multi-Mode-Electrode pro

用于伏安法的汞。可作 DME、SMDE 或 HMDE 使用

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